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Class : RESTRICTED
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Title : EXPERIMENTAL INVESTIGATIONS ON SEMI-CRYO ROCKET
ENGINE TURBO PUMP TURBINE PROFILES
PART II- ROTOR PROFILE

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NAL Project No. P-0-292

Document No. : PD - PR - 0907

Date of issue : MAR 2009

Contents : Pages 56 Figures 25 Tables 13 References 9

External Participation : --

Sponsor : LPSC, ISRO, Thiruvananthapuram

Approval : Head, Propulsion Division

Remarks :

Keywords : Aerodynamic performance, aerofoil, blade loading, cascade test, cascade tunnel, choke, chord, flow visualization, impulse turbine, pitch, probe, stagger, scanivalve scanner, separation, test section, wake

Abstract : LPSC, ISRO, as part of their semi-cryogenic rocket engine development program for the reusable launch vehicle, desired to get its turbo pump turbine profiles tested in the NAL Transonic Cascade Tunnel (TCT), to obtain basic aerodynamic performance data. The mean section profiles of the nozzle vane and rotor blade of this turbo pump turbine were tested in TCT. The test details and results of the rotor blade profile are discussed in this report viz a viz Part II and the details pertaining to the nozzle vane profile are furnished in Part I. The aerodynamic performance parameters such as profile loss, flow deflection, flow velocities and surface Mach number distribution were evaluated during the cascade tests. Both the profiles were tested over a range of inlet flow angles and outlet Mach numbers covering their respective design and off-design conditions. Detailed post processing of the test results were carried out and key aspects such as the effect of incidence and effect of Mach number on the performance were studied. An oil flow visualization study was also conducted on these profiles at their respective design condition to ascertain the flow pattern over the blade surfaces.